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## Sprained Ankle

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A sprained ankle is a very common injury. Approximately 25,000 people experience it each day. A sprained ankle can happen to athletes and non-athletes, children and adults. It can happen when you take part in sports and physical fitness activities. It can also happen when you simply step on an uneven surface, or step down at an angle.

The ligaments of the ankle hold the ankle bones and joint in position. They protect the ankle joint from abnormal movements-especially twisting, turning, and rolling of the foot.

A ligament is an elastic structure. Ligaments usually stretch within their limits, and then go back to their normal positions. When a ligament is forced to stretch beyond its normal range, a sprain occurs. A severe sprain causes actual tearing of the elastic fibers.

### How It Happens

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Ankle sprains happen when the foot twists, rolls or turns beyond its normal motions. A great force is transmitted upon landing. You can sprain your ankle if the foot is planted unevenly on a surface, beyond the normal force of stepping. This causes the ligaments to stretch beyond their normal range in an abnormal position.

### Mechanism of Injury

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If there is a severe in-turning or out-turning of the foot relative to the ankle, the forces cause the ligaments to stretch beyond their normal length. If the force is too strong, the ligaments can tear. You may lose your balance when your foot is placed unevenly on the ground. You may fall and be unable to stand on that foot. When excessive force is applied to the ankle's soft tissue structures, you may even hear a "pop". Pain and swelling result.

The amount of force determines the grade of the sprain. A mild sprain is a Grade 1. A moderate sprain is a Grade 2. A severe strain is a Grade 3 (see Table below).

- **Grade 1 sprain:**

Slight stretching and some damage to the fibers (fibrils) of the ligament.

- **Grade 2 sprain:**

Partial tearing of the ligament. If the ankle joint is examined and moved in certain ways, abnormal looseness (laxity) of the ankle joint occurs.

- **Grade 3 sprain:**

Complete tear of the ligament. If the examiner pulls or pushes on the ankle joint in certain movements, gross instability occurs.

Severity	Physical Examination Findings	Impairment	Pathophysiology	Typical Treatment*
Grade 1	Minimal tenderness and swelling	Minimal	Microscopic tearing of collagen fibers	Weight bearing as tolerated No splinting/casting Isometric exercises Full range-of-motion and stretching/strengthening exercises as tolerated
Grade 2	Moderated tenderness and swelling Decreased range of motion Possible instability	Moderated	Complete tears of some but not all collagen fibers in the ligament	Immobilization with air splint Physical therapy with range-of-motion and stretching/ strengthening exercises
Grade 3	Significant swelling and tenderness Instability	Severe	Complete tear/ rupture of ligament	Immobilization Physical therapy similar to that for grade 2 sprains but over a longer period Possible surgical reconstruction

## **Diagnosis**

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See your doctor to diagnose a sprained ankle. He or she may order X-rays to make sure you don't have a broken bone in the ankle or foot. A broken bone can have similar symptoms of pain and swelling.

The injured ligament may feel tender. If there is no broken bone, the doctor may be able to tell you the grade of your ankle sprain based upon the amount of swelling, pain and bruising.

The physical exam may be painful. The doctor may need to move your ankle in various ways to see which ligament has been hurt or torn.

If there is a complete tear of the ligaments, the ankle may become unstable after the initial injury phase passes. If this occurs, it is possible that the injury may also cause damage to the ankle joint surface itself.

The doctor may order an MRI (magnetic resonance imaging) scan if he or she suspects a very severe injury to the ligaments, injury to the joint surface, a small bone chip or other problem. The MRI can make sure the diagnosis is correct. The MRI may be ordered after the period of swelling and bruising resolves.

## **Symptoms**

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The amount of pain depends on the amount of stretching and tearing of the ligament. Instability occurs when there has been complete tearing of the ligament or a complete dislocation of the ankle joint.

## **Treatment**

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### ***Nonsurgical Treatment***

Walking may be difficult because of the swelling and pain. You may need to use crutches if walking causes pain. Usually swelling and pain will last two days to three days. Depending upon the grade of injury, the doctor may tell you to use removable plastic devices such as castboots or air splints.

Most ankle sprains need only a period of protection to heal. The healing process takes about four weeks to six

weeks. The doctor may tell you to incorporate motion early in the healing process to prevent stiffness. Motion may also aid in being able to sense position, location, orientation and movement of the ankle (proprioception). Even a complete ligament tear can heal without surgical repair if it is immobilized appropriately. Even if an ankle has a chronic tear, it can still be highly functional because overlying tendons help with stability and motion.

For a Grade 1 sprain, use R.I.C.E (rest, ice, compression and elevation):

- **Rest** your ankle by not walking on it.
- **Ice** should be immediately applied. It keeps the swelling down. It can be used for 20 minutes to 30 minutes, three or four times daily. Combine ice with wrapping to decrease swelling, pain and dysfunction.
- **Compression** dressings, bandages or ace-wraps immobilize and support the injured ankle.
- **Elevate** your ankle above your heart level for 48 hours.

For a Grade 2 sprain, the RICE guidelines can also be used. Allow more time for healing to occur. The doctor may also use a device to immobilize or splint the ankle.

A Grade 3 sprain can be associated with permanent instability. Surgery is rarely needed. A short leg cast or a cast-brace may be used for two weeks to three weeks.

Rehabilitation is used to help to decrease pain and swelling and to prevent chronic ankle problems. Ultrasound and electrical stimulation may also be used as needed to help with pain and swelling. At first, rehabilitation exercises may involve active range of motion or controlled movements of the ankle joint without resistance. Water exercises may be used if land-based strengthening exercises, such as toe-raising, are too painful. Lower extremity exercises and endurance activities are added as tolerated. Proprioception training is very important, as poor proprioception is a major cause of repeat sprain and an unstable ankle joint. Once you are pain-free, other exercises may be added, such as agility drills. The goal is to increase strength and range of motion as balance improves over time.

All ankle sprains recover through three phases:

- **Phase 1** includes resting, protecting the ankle and reducing the swelling (one week).
- **Phase 2** includes restoring range of motion, strength and flexibility (one week to two weeks).
- **Phase 3** includes gradually returning to activities that do not require turning or twisting the ankle and doing maintenance exercises. This will be followed later by being able to do activities that require sharp, sudden turns (cutting activities) such as tennis, basketball or football (weeks to months).

### **Medication**

Nonsteroidal anti-inflammatory drugs (NSAIDs) may be used to control pain and inflammation.

### **Long-term outcome**

If an ankle sprain is not recognized, and is not treated with the necessary attention and care, chronic problems of pain and instability may result.

### ***Surgical Treatment***

Surgical treatment for ankle sprains is rare. Surgery is reserved for injuries that fail to respond to nonsurgical treatment, and for persistent instability after months of rehabilitation and non-surgical treatment.

Surgical options include:

- **Arthroscopy**

A surgeon looks inside the joint to see if there are any loose fragments of bone or cartilage, or part of the ligament caught in the joint.

- **Reconstruction**

A surgeon repairs the torn ligament with stitches or suture, or uses other ligaments and/or tendons found in the foot and around the ankle to repair the damaged ligaments.

## **Rehabilitation**

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Rehabilitation after surgery involves time and attention to restore strength and range of motion so you can return to pre-injury function. The length of time you can expect to spend recovering depends upon the extent of injury and the amount of surgery that was done. Rehabilitation may take from weeks to months.

## **Prevention**

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The best way to prevent ankle sprains is to maintain good strength, muscle balance and flexibility.

- Warm-up before doing exercises and vigorous activities
- Pay attention to walking, running or working surfaces
- Wear good shoes
- Pay attention to your body's warning signs to slow down when you feel pain or fatigue

## **Is It Acute or Chronic?**

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If you have sprained your ankle in the past, you may continue to sprain it if the ligaments did not have time to completely heal. If the sprain happens frequently and pain continues for more than four weeks to six weeks, you may have a chronic ankle sprain. Activities that tend to make an already sprained ankle worse include stepping on uneven surfaces, cutting actions and sports that require rolling or twisting of the foot, such as trail running, basketball, tennis, football and soccer.

Possible complications of ankle sprains and treatment include abnormal proprioception. There may be imbalance and muscle weakness that causes a re-injury. If this happens over and over again, a chronic situation may persist with instability, a sense of the ankle giving way (gross laxity) and chronic pain. This can also happen if you return to work, sports or other activities without letting the ankle heal and become rehabilitated.

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Foot and Ankle Exercise Conditioning Program

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